GARMIN

GMA 240
Installation Manual

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RECORD OF REVISIONS

Revision	Revision Date	Description
A	06/09/08	Initial Release
B	01/18/11	Clarified backlighting info
C	04/13/11	Clarified mono/stereo headset switch info
D	06/16/12	Corrected temperature range spec

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CURRENT REVISION DESCRIPTION

Revision	Page Number	Section Number	Description of Change
D	1-3	1.3.2	Correct temp range spec
	3-2	3.2	Removed #16 AWG wiring info, updated Table 3-2 and wiring info
	4-6	4.5.2	Corrected description in Table 4-8
	A-1, A-2	Appdx A	Added connector numbers to drawings

DOCUMENT PAGINATION

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GMA 240 HARDWARE MOD LEVEL HISTORY

The following table identifies hardware modification (Mod) Levels for the GMA 240 Audio Panel. Mod Levels are listed with the associated service bulletin number, service bulletin date, and the purpose of the modification. The table is current at the time of publication of this manual (see date on front cover) and is subject to change without notice. Authorized Garmin Sales and Service Centers are encouraged to access the most up-to-date bulletin and advisory information on the Garmin Dealer Resource web site at www.garmin.com using their Garmin-provided user name and password.

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1 GENERAL DESCRIPTION

1.1 Introduction

This manual provides the installation instructions for the Garmin GMA 240 Audio Panel. Reference to GMA 240 throughout this manual refers to all versions of the unit. Information pertaining to the maintenance of the unit can be found in the GMA 240 Maintenance Manual, P/N 190-00917-02. Information pertaining to the operation of the unit can be found in the GMA 240 Pilot's Guide, P/N 190-00917-00.

1.2 Equipment Description

The Garmin GMA 240 Audio Panel is not a TSO-certified product and has received no FAA approval or endorsement.

The GMA 240 meets the needs of aircraft owners and operators who require reliability and versatility in the essential audio switching function. LED-illuminated push-button simplicity and intuitive panel layout allow audio selection of both NAV and COM audio. Large, single-button activation of the COM microphone and audio for two COM transceivers simplifies cockpit workload. Photocell dimming circuitry automatically adjusts the brightness of the annunciators to a level appropriate for ambient cockpit light. The brightness of the backlighting is controlled by the aircraft lighting bus. A fail-safe circuit connects the pilot's headset and microphone directly to COM1 and a fail-safe warning audio input in the event that power is interrupted or the unit is turned off.

Additionally, the GMA 240 includes a four-position intercom (ICS) with electronic cabin noise de-emphasis, two stereo music inputs, and independent pilot and copilot/passenger volume controls. To further simplify the cockpit workload, the intercom provides for pilot isolation. One hundred percent solid state circuitry and extensive use of surface mount technology are employed.

Figure 1-1. GMA 240 Unit View

1.2.1 Features Summary

- User-friendly, intuitive front panel layout
- LEDs indicate selected function
- Four position intercom: pilot, copilot, two passengers
- Two stereo headset amplifiers: one for pilot, one for copilot/passengers
- Two differential stereo music source inputs
- Front panel music volume control, source selection, and master music on/off switch
- Front panel controls for music muting by intercom and selected radios
- Two selectable intercom operational modes
- Selectable aural pushbutton annunciation (beep)
- Independent pilot, copilot/passenger intercom volume and squelch controls
- Individual VOX circuits for each of four (4) mic inputs
- Automatic selection of COM audio source when corresponding mic is selected
- Memory of explicitly selected COM audio source(s) when changing COM mic selection
- MASQ™ Processing with configurable mute threshold
- COM swap function
- PTT indication
- Power-off fail-safe to connect Pilot PTT, mic, and Headset to COM 1 if unit is turned off
- Power-off fail-safe warning audio input
- Full duplex Telephone interface
- Front Panel Mini-Jack (MP3 player, cellular phone, etc.)

1.3 Technical Specifications

1.3.1 Physical Characteristics

Table 1-1 Physical Characteristics

Characteristic	Specification
Bezel Height	1.30 inches (33 mm)
Bezel Width	6.29 inches (159.77 mm)
Rack Height (Dimple to Dimple)	1.33 inches (34 mm)
Rack Width	6.30 inches (160.02 mm)
Depth Behind Panel with Connectors (measured from face of aircraft panel to rear of connector backshells)	7.12 inches (181 mm)
GMA 240 Weight (Unit Only)	15.5 oz (440 g)
GMA 240 Weight (Installed with rack and connectors)	24 oz (680 g)

1.3.2 Electrical Characteristics

Table 1-2 Electrical Characteristics

Characteristic	Specification
Temperature Range	-20 C to +55 C (operation) -55 C to +85 C (storage)
Altitude	55,000 Feet
Audio Panel Functions	Dedicated Transceiver inputs: 3 (including TEL) Dedicated Receiver inputs: 4 (all independently selectable) Alert (unswitched) inputs: 3 (each with configurable volume) Input impedance: 500 Ω Input isolation: 60 dB minimum Alert/Receiver/Transceiver bandwidth: 100 Hz to 6.5 kHz Special functions: Fail-safe operation MASQ™ processing (Master Avionics Squelch) Configurable button push aural annunciation
Intercom Functions	Positions: 4 (pilot, copilot, 2 passengers) Volume controls: 3 (pilot, copilot/passengers, music) VOX level controls: 2 (pilot, copilot/passengers) VOX circuits: 4 (one per mic input) Microphone input impedance: 450 Ω (compatible with 150 to 600 Ω mics) Microphone bias voltage: about 10 Vdc delivered through 450 Ω Microphone response: 9-pole characteristic cabin noise de-emphasis Intercom isolation modes: 2 - all, pilot (or configure for all, crew) Telephone interfaces: 1 full-duplex (use LRU pins or front jack)
Headphone Outputs	Output amplifiers: 2 stereo (pilot, copilot/passengers) Fidelity: Load / Power / Distortion (typ.) 150 Ω / 50 mW / <0.03% THD+N 150 Ω / 100 mW / <0.07% THD+N 50 Ω / 150 mW / <0.07% THD+N 50 Ω / 300 mW / <0.10% THD+N Compatible with higher headphone impedances, those shown are for worst-case distortion and bandwidth

Table 1-2 Electrical Characteristics

Characteristic	Specification
Music Functions	Music inputs (stereo): 2 Music input impedance: 600 Ω (differential) Music gain: -20dB @ min volume, +26dB @ max. volume (typ.) Music input level:<200 mVrms for full power* output @ max music volume knob position (typ.) 3.5 Vrms max music input level Music bandwidth: 20 Hz to 20 kHz @ full power output Music distortion: <0.1% THD+N (typ.) @ full power, full bandwidth Special Functions: Front panel selection and volume control Front panel control for muting by radios and ICS Muting by alerts configurable *Full power output refers to 300 mW into 50 Ω (three 150 Ω headsets in parallel each driven to 100 mW)
Front Panel Mini-Jack Functions	Input Impedance: 5.1 kΩ Music Input: Auto detection of music source will use jack as Music 1 Telephone Input: Auto detection of TEL source will use jack for TEL Telephone ring signal is heard without TEL selected

1.3.3 Power Requirements

Table 1-3 Power Requirements

Characteristic	Specification
Input Voltage Range	11 to 33 Vdc
Power Input	4.3 W normal operation (310mA @ 13.8 V) 7.5 W max. operation (540 mA @ 13.8 V)

1.4 Reference Documents

The following publications are sources of additional information for installing the GMA 240. Before installing the unit, the technician should read all referenced materials along with this manual.

Table 1-4 Reference Documents

Part Number	Document
190-00917-00	GMA 240 Pilot's Guide
190-00917-02	GMA 240 Maintenance Manual

2 INSTALLATION OVERVIEW

2.1 Introduction

This section provides the necessary information for the installation and checkout of the GMA 240 Audio Panel. Installation of the GMA 240 will differ according to equipment location and other factors. Cabling will be fabricated by the installing agency to fit these various requirements. The appendices contain interconnect wiring diagrams, mounting dimensions, and information pertaining to installation.

2.2 Installation Materials

2.2.1 Equipment Available

GMA 240 Audio Panel, Ship Level Assembly, P/N 010-00735-() includes the following, depending on part number:

Table 2-1

Item	Garmin P/N
Connector Kit, GMA 340	011-00652-00
Rack Backplate, GMA 340	011-00678-00
Unit Assembly, GMA 240	011-01988-00
Audio Cables, 2.5 mm RA Stereo Plug	011-02079-00
Install Rack, GMA 340	115-00262-00

2.2.2 Additional Equipment Required

- Cables: The installer will fabricate and supply all system cables. Interconnect wiring diagrams are detailed in Appendix B.
- Hardware: #6-32 100° flat head screw (6 ea.) and #6-32 self-locking nut (6 ea.). Hardware required to mount the installation rack is not provided.
- Stereo headphone jacks (up to 4), microphone jacks (up to 4), 3.5mm stereo jacks (up to 2). Insulating type jacks or insulating washers should be used for all jacks to isolate them from aircraft chassis.

2.3 GMA 240 Wiring, Configuration, and Adjustment Options

The GMA 240 has several configuration/adjustment options, consideration of these options should be discussed with the end user(s) of the aircraft before wiring begins. These configuration/adjustments are described in the following sections:

- Wiring options - Section 2.3.1 and Section 4.4.1
- Internal configuration jumpers - Section 2.3.1
- Volume/Mute adjustments - Section 2.3.2

2.3.1 Internal Configuration Jumpers

The following internal configuration adjustments may be made by removing or replacing jumpers on the PCB. The jumper positions are designed to accept a 0Ω resistor of 0603 size. Refer to Appendix C for component location.

This service should only be performed by a qualified technician. Garmin is not responsible for damage caused during adjustment of these internal configuration jumper settings. Refer to the GMA 240 Maintenance Manual for disassembly/reassembly instructions.

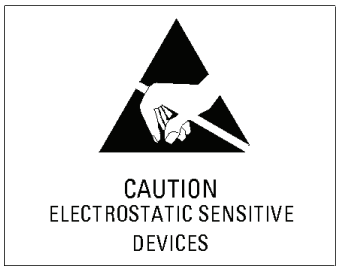


Figure 2-1 ESD Caution Logo

NOTE

The GMA 240 contains static sensitive components. Observe proper anti-static procedures when performing any solder procedures on the unit.

Table 2-1 Configuration Jumpers

Component	Name	Default	Description
R0303	Alert Mutes Music	Populated	If this jumper is removed, music will not be interrupted by alert audio. Default operation is recommended.
R0304	COM1 Internal Sidetone	Empty	If a jumper is supplied in these positions, internal sidetone will be heard during PTT to simulate received sidetone from a radio that does not provide one during transmission. This should only be used if a radio does not perform this function already.
R0305	COM2 Internal Sidetone	Empty	
R0308	TEL Internal Sidetone	Populated	If this jumper is removed, intercom audio and intercom sidetone will not be heard when the TEL button is selected. Many phones supply sidetone when a call is in session. This causes a noticeable change in intercom sound quality but it is usually not disruptive. Default operation is recommended unless the effect of sidetone from the telephone is disruptive to intercom operation.
R0315	TEL jack detect bypass	Empty	If a jumper is supplied in this position, when TEL is selected the audio panel will assume a telephone is in use in the front jack regardless of phone detection. This should be used only if the audio panel is not capable of properly detecting the telephone that will be used in the installation.

Table 2-1 Configuration Jumpers

Component	Name	Default	Description
R0314	Only Primary COM mutes MUSIC	Empty	If a jumper is supplied in this position, the RADIO button will mute music only when the Primary COM (the COM selected for transmission) is receiving audio. Default RADIO mutes music operation occurs when any selected COM / NAV / AUX radio is receiving audio.
R0313	Enable KEYED ICS	Empty	If a jumper is supplied in this position, the intercom system (ICS) will only allow intercom MIC audio to be heard when the corresponding ICS KEY for the MIC position is pressed. When this configuration is used, the VOX knobs should be set fully CCW (live MIC). See Section 4.5.2 for information on wiring intercom keys.
R0312	Reserved	Empty	Reserved
R0309	Reserved	Empty	Reserved
R0302	Reserved	Empty	Reserved
R0301	Reserved	Empty	Reserved
R0300	Reserved	Empty	Reserved

2.3.2 VOLUME/MUTE Configuration Adjustments

The following adjustments can be made through access holes in the top cover of the GMA 240:

- Alert 1 Volume
- Alert 2 Volume
- Alert 3 Volume
- Rear connector TEL input volume
- Front panel jack TEL input volume
- MASQ (Master Avionics SQuelch) mute level

Refer to Figure 2-2 for the location of the access holes.

CAUTION

Exercise care when inserting adjustment tools through the top cover. Damage to the unit may occur if an adjustment tool is accidentally forced against unintended components or circuit board paths. Use a 2 mm (max blade width) flat-blade non-conductive screw driver or adjustment tool.

CW adjustment increases the levels for volume inputs and for the mute threshold for radio inputs.

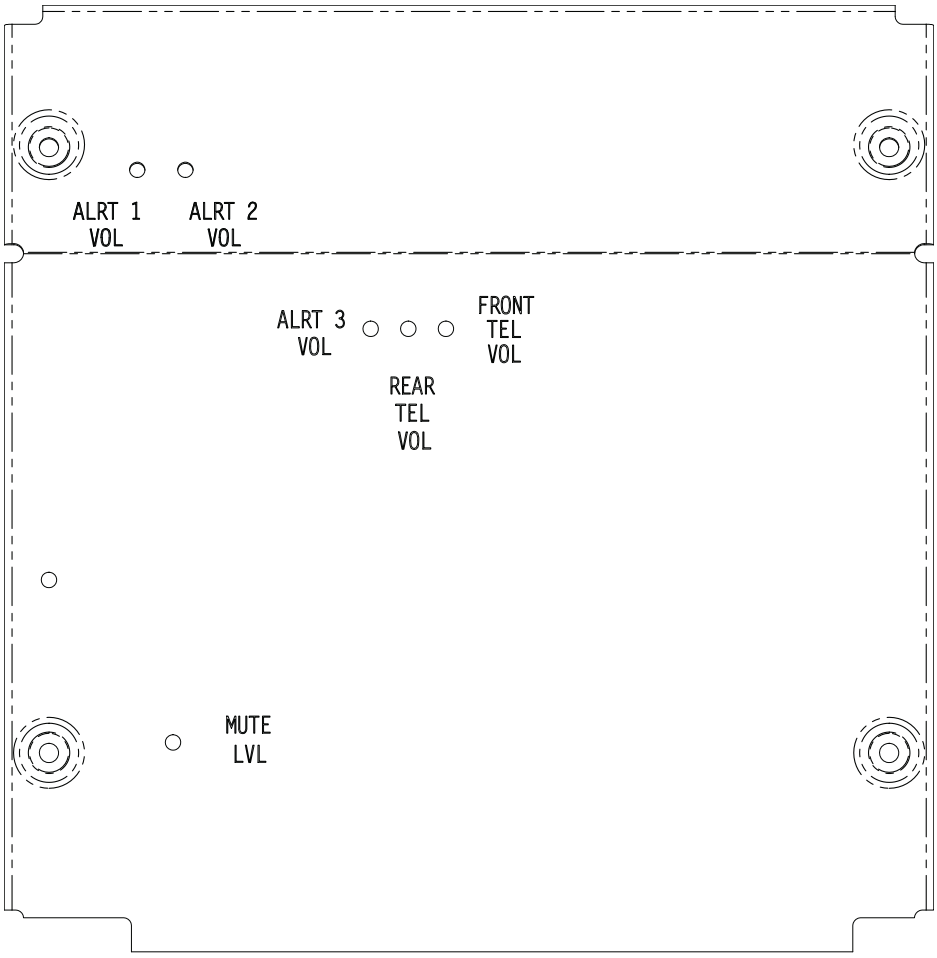


Figure 2-2 Access Hole Locations (Top View)

2.3.3 Hardwire Configuration Option

The following configuration options are available by externally wiring pins to aircraft chassis. When change of operation is desired during flight, these can optionally be wired to chassis through a suitable switch mounted in reach of the operator. See Section 4.4.1 for connector and pin details for implementing these configuration options.

MASQ™ INHIBIT: The Master Avionics SQuelch inhibit configuration option allows selected avionics audio inputs (COM, NAV, AUX) and alerts to be heard even if they do not exceed the MASQ threshold. This increases background noise during otherwise quiet operation because noise from these inputs is not squelched. This option is most useful as a troubleshooting tool.

CREW ISO: This input configures the audio panel for crew intercom isolation in place of pilot isolation. When the PILOT ISO key is selected, the pilot and copilot will hear each other but will be isolated from the passengers. When the CREW ISO configuration is selected, the copilot's headphone jack must be wired in parallel with the pilot headset output. Microphones are wired as normal.

PILOT ISO MUSIC: This input configures music to be heard by the pilot during PILOT ISO mode (or by the pilot and copilot if crew isolate mode is configured). Normally, the isolated ICS positions do not hear music.

BUTTON PRESS TONE ENABLE: This input enables an audible tone to be heard when a button press is

detected.

MUTE ON COM TX: This input configures the audio panel to mute all selected radios (COM, NAV, AUX) except the mic selected COM (COM selected for transmission) when a PTT key is activated for COM transmit.

2.4 Noise

Because the audio panel is a point in the aircraft where signals from many pieces of equipment are brought together, care must be taken to minimize effects from coupled interference and ground loops.

Coupled interference can sneak into audio system interconnecting cables when they are routed near large AC electric fields, AC voltage sources, and pulse equipment (strobes, spark plugs, magnetos, EL displays, CRTs, etc). Interference can also couple into audio system interconnecting cables by magnetic induction when they are routed near large AC current-carrying conductors or switched DC equipment (heaters, solenoids, fans, autopilot servos, etc).

Ground loops are created when there is more than one path in which return currents can flow, or when signal returns share the same path as large currents from other equipment. These large currents create differences in ground potential between the various equipment operating in the aircraft. These differences in potential can produce an additive effect at an audio panel signal input.

The audio panel may "see" the desired input signal plus an unwanted component injected by ground differentials, a common cause of alternator-related noise. This is the main reason why all audio jacks should be isolated from ground. Terminating audio shields just at one end eliminates another potential ground loop injection point.

Single-point grounding cannot be overstressed for the various avionics producing and processing audio signals. Single-point, in this context, means that the various pieces of equipment share a single common ground connection back to the airframe. Good aircraft electrical/charging system ground bonding is also important.

The wiring diagrams and accompanying notes in this manual should be followed closely to minimize noise effects.

2.5 GMA 240 Mounting

The GMA 240 mounting surface must be capable of providing structural support and electrical bond to the aircraft to minimize radiated EMI and provide protection from High-Intensity Radiation Fields (HIRF).

The GMA 240 is mounted using a GMA 340 unit rack. Figure 2-3 shows the GMA 340 unit rack. See Section 3.4 for installation instructions.

NOTE

Rear support is recommended to ensure a sturdy mount.

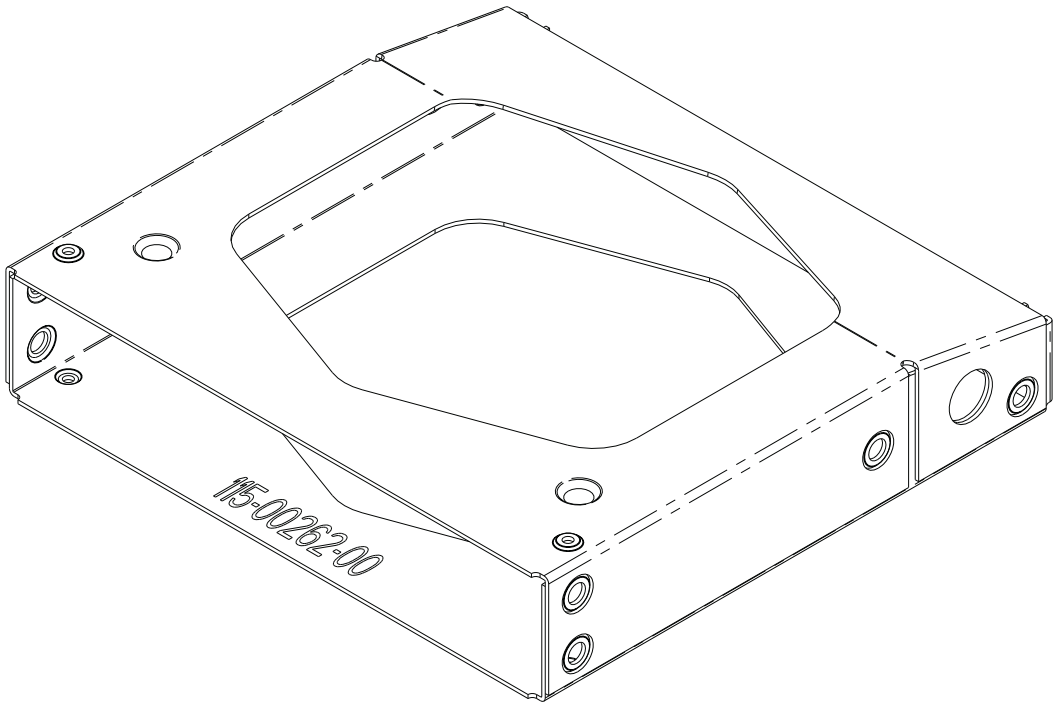


Figure 2-3 GMA 340 Unit Rack (115-00262-00)

3 INSTALLATION PROCEDURE

3.1 Unpacking Unit

Carefully unpack the equipment and make a visual inspection of the unit for evidence of damage incurred during shipment. If the unit is damaged, notify the carrier and file a claim. To justify a claim, save the original shipping container and all packing materials. Do not return the unit to Garmin until the carrier has authorized the claim.

Retain the original shipping containers for storage. If the original containers are not available, a separate cardboard container should be prepared that is large enough to accommodate sufficient packing material to prevent movement.

3.2 Electrical Connections

All electrical connections to the GMA 240 are made through two 44-pin D-subminiature connectors (see Figure 3-1). Section 4 defines the electrical characteristics of all input and output signals. Required connector and associated hardware are supplied in the connector kit (P/N 011-00652-00). See Appendix B for interconnect wiring diagrams.

Check wiring connections for errors before inserting the GMA 240 into the rack. Incorrect wiring could cause internal component damage.

Table 3-1 Pin Contact Part Numbers

Manufacturer	22-28 AWG
Garmin P/N	336-00021-00
Military P/N	M39029/58-360
AMP	204370-2
Positronic	MC8522D
ITT Cannon	030-2042-000

Table 3-2 Recommended Crimp Tools

Manufacturer	Hand Crimping Tool	High Density 22-28 AWG	
		Positioner	Insertion/Extraction Tool
Military P/N	M22520/2-01	M22520/2-09	M81969/1-04
Positronic	9507	9502-4	M81969/1-04
AMP	601966-1	601966-6	91067-1
Daniels	AFM8	K42	M81969/1-04

NOTE

Non-Garmin part numbers shown are not maintained by Garmin and consequently are subject to change without notice.

3.3 Audio Shield Termination

The audio shield wires should be terminated at the rear of the unit to the screws between J2401 and J2402 as shown in Figure 3-1.

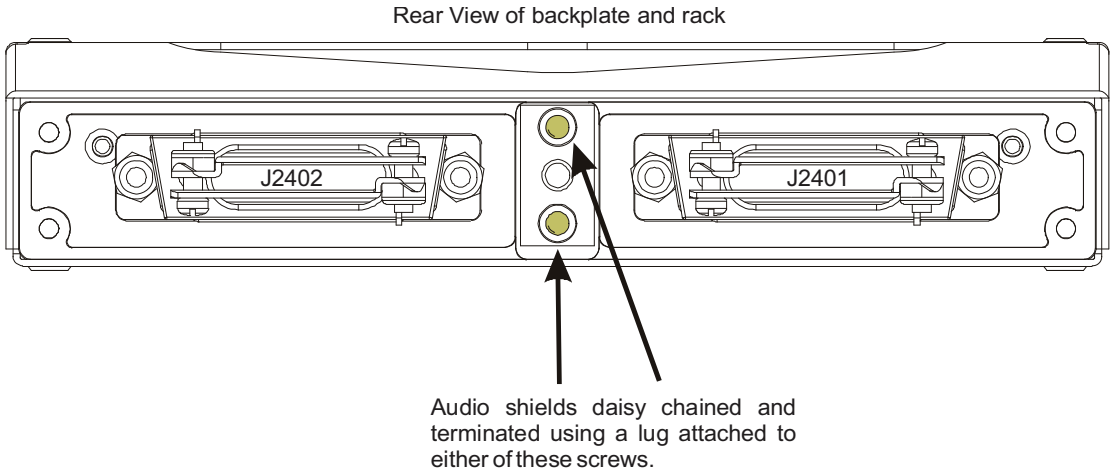

Rear View of backplate and rack
J2402
J2401
Audio shields daisy chained and terminated using a lug attached to either of these screws.

Figure 3-1 Audio Shield Termination

3.4 GMA 240 Installation

NOTE

Avoid installing the unit near heat sources. If this is not possible, ensure that additional cooling is provided. Allow adequate space for installation of cables and connectors. The installer will supply and fabricate all of the cables.

1. Assemble the connector/rack kit according to Table 4-1, Table 4-2; and Figure B-1 and Figure B-1. Install the rack assembly according to the dimensions given in Figure A-1 and Figure A-3. Mounting brackets are not supplied due to the wide range of mounting configurations available. Suitable mounting brackets may be fabricated from sheet metal or angle stock. To ensure a sturdy mount, rear support for the unit should be provided.
2. Slide the unit into the rack until the jackscrew makes contact with the receptacle located in the back plate.
3. Insert a 3/32" Allen wrench into the jackscrew access hole on the faceplate.
4. Turn the Allen wrench clockwise until the unit is secured in the rack. Continue turning until tight, but do not over-tighten.

CAUTION

Do not use excessive force when inserting the GMA 240 into the rack. This may damage the connectors, unit, and/or unit rack. If heavy resistance is felt during installation, stop, and remove the GMA 240 and identify the source of resistance.

5. To remove the unit from the rack, turn the Allen wrench counterclockwise until it disengages from the rack.

3.5 Post Installation Checkout

CAUTION

Check wiring connections for errors before inserting the GMA 240 into the rack. Incorrect wiring could cause internal component damage.

An in-aircraft checkout may be performed in the aircraft on the ramp with known good microphone, headset, and avionics receivers.

3.5.1 Lamp Test

1. Apply power to the unit by rotating the pilot intercom knob clockwise.
2. Verify that all annunciators on the front panel are illuminated during initial power up.

3.5.2 Failsafe Operation Check

1. Turn the unit off by rotating the pilot intercom knob fully counter clockwise.
2. Check the failsafe operation by exercising the COM 1 microphone, microphone key, and monitoring received COM 1 audio over the pilot headphone's left earpiece.
3. If installed, check that the failsafe warning is heard in the pilot headphone's left earpiece.
4. Turn the unit back on to continue testing.

3.5.3 Transceiver Operational Check

1. Perform a ramp test radio check by exercising the installed transceivers, microphone, microphone key, and audio over the headphone.
2. Verify that communications are loud and clear and PTT operation is correct.

3.5.4 Intercom System (ICS) Check

NOTE

Stereo headsets are recommended if stereo jacks are installed. Alternatively, the installation should employ stereo jacks with a mono/stereo switch that disconnects the audio panel's right channel output from the jack's ring contact when in mono mode. If a monaural headset is used in a stereo jack, the audio panel's right channel output is shorted to ground by the mono headset's plug. This causes excess power supply current to be drawn. While this does not damage the unit's output circuitry, prolonged periods (especially at high volume) may cause the internal power input fuse to open. This is because the unit is optimized for low-power operation in systems with limited power budgets. In the case of copilot/passenger positions wired in parallel, any stereo listener will lose right channel audio when another passenger plugs in a mono headset.

1. Set the intercom to the ALL mode [Pilot ISO LED off.]
2. Plug in headsets at each ICS position.

NOTE

For helicopter operation using a two-stage Intercom/PTT switch, prior to using the keyed-intercom mode, the VOX level should be set by adjusting the VOX knob while the first detent is actuated and held.

3. Check Pilot and Copilot ICS positions for isolation and proper operation of volume and squelch controls.

3.5.5 Aircraft Receivers Check

1. Select the audio source corresponding to each installed avionics unit and check for audio over the headsets.

3.5.6 Music System Check

1. Set the intercom to the ALL mode [Pilot ISO LED off.]
2. Connect a stereo audio source to MUSIC 1 (ensure the front panel jack is empty and the music volume knob is not set to minimum). Verify that stereo audio is heard over all headset positions when MUSIC 1 is selected as the music source and MUSIC LED is on. Pull out on the right side small knob and verify that music volume adjustment is working properly.
3. Select an audio source to COM 1 and verify that the sound is muted by active COM 1 audio when RADIO music mute is selected and by intercom audio when ICS music mute is selected.
4. Connect a stereo music source to MUSIC 2. Verify that stereo audio is heard when MUSIC 2 is selected as the music source and MUSIC LED is on.
5. Connect a stereo audio source to the front panel jack. Verify that stereo audio is heard when MUSIC 1 is selected as the music source and MUSIC LED is on.

CAUTION

Be sure to check all aircraft control movements before flight is attempted to ensure that the wiring harness does not touch any moving part.

This completes the in-aircraft post installation checkout. Perform a flight test after installing the unit to ensure satisfactory performance of the audio functions.

3.6 Configuration Adjustments

Adjustment to the Volume and Squelch settings can be made to the GMA 240 through access holes in the unit's top cover. Refer to Section 2.3 for details.

3.7 Continued Airworthiness

Maintenance of the GMA 240 is "on condition" only. Refer to the GMA 240 Maintenance Manual (Garmin P/N 190-00917-02) as needed. Periodic maintenance of the GMA 240 is not required. Instructions for Continued Airworthiness (ICA) are not required for this product under 14 CFR Part 21 since the GMA 240 has received no FAA approval or endorsement.

4 SYSTEM INTERCONNECTS

4.1 Connector Description

The GMA 240 has two 44-pin connectors located at the rear of the unit designated J2401 and J2402 which are oriented as shown in Figure 4-1.

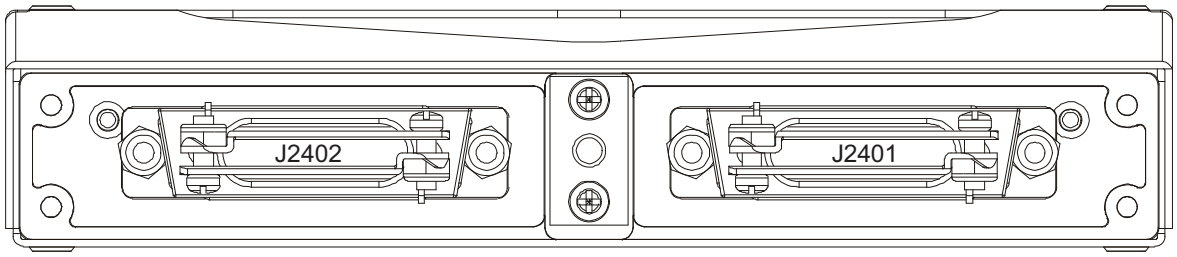


Figure 4-1 Rear View of Backplate and Rack

4.2 Pin List

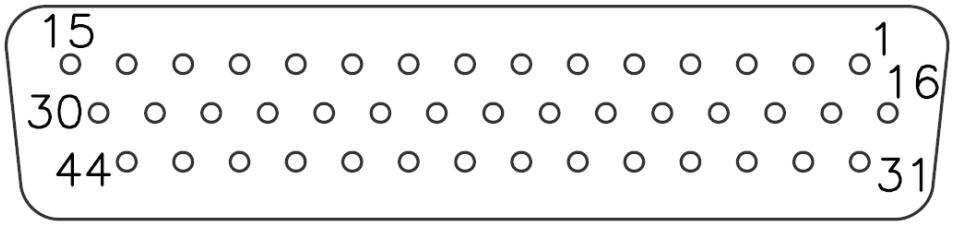


Figure 4-2 Rear Connectors J2401 & J2402, Viewed from Back of Unit

J2401 and J2402 pins are configured as shown in Figure 4-2. J2401 and J2402 pin assignments are given in Table 4-1, Table 4-2, and Appendix B.

Following the pin assignment tables (Table 4-1 & Table 4-2), additional tables group pin connections by function.

An asterisk (*) following a signal name denotes that the signal is active low logic. Active low inputs are connected to ground to activate. Active low outputs sink current to ground when active.

4.2.1 P2401 Connector

Table 4-1 J2401 Pin Assignments

Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	TEL AUDIO IN HI	IN
4	TEL AUDIO LO	--
5	TEL MIC AUDIO OUT HI	OUT
6	RESERVED	--
7	AUX2 AUDIO IN HI	IN

Table 4-1 J2401 Pin Assignments

Pin	Pin Name	I/O
8	AUX2 AUDIO IN LO	--
9	COM 1 AUDIO IN HI	IN
10	COM 1 AUDIO LO	--
11	COM 1 MIC AUDIO OUT HI	OUT
12	COM 1 MIC KEY* OUT	OUT
13	COM 2 AUDIO IN HI	IN
14	COM 2 AUDIO LO	--
15	COM 2 MIC AUDIO OUT HI	OUT
16	MASQ INHIBIT* IN	IN
17	NAV 1 AUDIO IN HI	IN
18	NAV 1 AUDIO IN LO	--
19	NAV 2 AUDIO IN HI	IN
20	NAV 2 AUDIO IN LO	--
21	AUX1 AUDIO IN HI	IN
22	AUX1 AUDIO IN LO	--
23	RESERVED	--
24	RESERVED	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	RESERVED	--
29	CREW ISO* IN	IN
30	COM 2 MIC KEY* OUT	OUT
31	ALERT 1 AUDIO IN HI	IN
32	ALERT 1 AUDIO IN LO	--
33	PILOT MIC AUDIO IN HI	IN
34	PILOT MIC KEY* IN	IN
35	PILOT MIC AUDIO IN LO	--
36	RESERVED	--
37	RESERVED	--
38	RESERVED	--
39	RESERVED	--
40	PASS HEADSET AUDIO OUT LEFT	OUT
41	PASS HEADSET AUDIO OUT RIGHT	OUT
42	PASS HEADSET AUDIO OUT LO	--
43	ALERT 2,3 AUDIO IN LO	--
44	ALERT 2 AUDIO IN HI	IN

*Denotes Active Low (Inputs: ground to activate; Outputs: grounded when active)

4.2.2 J2402 Connector

Table 4-2 J2402 Pin Assignments

Pin	Pin Name	I/O
1	PILOT HEADSET AUDIO OUT LO	--
2	COPILOT HEADSET AUDIO OUT LO	--
3	COPILOT HEADSET AUDIO OUT LEFT	OUT
4	COPILOT HEADSET AUDIO OUT RIGHT	OUT
5	LIGHTING BUS 14V LO/28V LO	--
6	LIGHTING BUS 14V HI/28V LO	IN
7	LIGHTING BUS 14V HI/28V HI	IN
8	AIRCRAFT POWER	IN
9	AIRCRAFT POWER	IN
10	AIRCRAFT GROUND	--
11	AIRCRAFT GROUND	--
12	RESERVED	--
13	PILOT ISO MUSIC* IN	IN
14	PILOT ISO MUSIC* RETURN	--
15	ALERT 3 AUDIO IN HI	IN
16	PILOT HEADSET AUDIO OUT LEFT	OUT
17	RESERVED	--
18	RESERVED	--
19	BUTTON PRESS TONE ENABLE* IN	IN
20	COM SWAP* IN	IN
21	COM SWAP* IN RETURN	--
22	RESERVED	--
23	MUSIC 1 IN LEFT	IN
24	MUSIC 1 IN RIGHT	IN
25	MUSIC 1 IN LO	--
26	MUSIC 2 IN LEFT	IN
27	MUSIC 2 IN RIGHT	IN
28	MUSIC 2 IN LO	--
29	FAILSAFE WARN AUDIO IN HI	IN
30	MUTE ON COM TX* IN	IN
31	PILOT HEADSET AUDIO OUT RIGHT	OUT
32	COPILOT MIC AUDIO IN HI	IN
33	COPILOT MIC KEY* IN	IN
34	COPILOT MIC AUDIO IN LO	--
35	PASS 1 MIC AUDIO IN HI	IN

*Denotes Active Low (Inputs: ground to activate; Outputs: grounded when active)

Table 4-2 J2402 Pin Assignments

Pin	Pin Name	I/O
36	PASS 1 MIC AUDIO IN LO	--
37	PASS 2 MIC AUDIO IN HI	IN
38	PASS 2 MIC AUDIO IN LO	--
39	RESERVED	--
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	RESERVED	--
44	RESERVED	--

* Denotes Active Low (Inputs: ground to activate; Outputs: grounded when active)

4.2.3 P2403 Connector (front panel 2.5 mm mini-jack)

Figure 4-3 2.5 mm Plug Used with P2403

Table 4-3 P2403 Connector

Pin	Pin Name	I/O
TIP	MUSIC 1 LEFT IN/TEL MIC OUT HI	I/O
RING	MUSIC 1 RIGHT IN/TEL AUDIO IN HI	IN
SLEEVE	MUSIC 1 LO IN/TEL AUDIO LO	--

4.3 Aircraft Power and Lighting

4.3.1 Aircraft Power

The GMA 240 has four inputs for aircraft power bus inputs of 14/28Vdc.

Table 4-4 Aircraft Power

Pin	Connector	Pin Name	I/O
8	P2402	AIRCRAFT POWER	IN
9	P2402	AIRCRAFT POWER	IN
10	P2402	POWER GROUND	--
11	P2402	POWER GROUND	--

4.3.2 Lighting Bus

The GMA 240 can be configured to track a 14 or 28 Vdc lighting bus using these inputs. These inputs must be connected to a supply voltage (in the appropriate voltage range) for the backlighting to function. Refer to Figure B-1 for lighting interconnections.

Backlighting refers only to the lighting of the text labels on the front panel and is controlled by the inputs in the below table. The brightness of the LED annunciators that illuminate each key when selected is controlled by a photocell that operates independently of the backlight input.

Table 4-5 Lighting Bus

Pin	Connector	Pin Name	I/O
5	P2402	LIGHTING BUS 14V LO/28V LO	--
6	P2402	LIGHTING BUS 14V HI/28V LO	IN
7	P2402	LIGHTING BUS 14V HI/28V HI	IN

4.4 Configuration Pins

4.4.1 External Configuration Pins

The following pins may be used to change the configuration of the installation as described.

Table 4-6 External Configuration Pins

Pin	Connector	Pin Name	Description
16	P2401	MASQ INHIBIT* IN	Ground to disable Master Avionics Squelch circuitry. This will cause alerts and selected radios to be heard at all times without needing to exceed the mute threshold. This causes an increase in background noise from the inputs during quiet output.
29	P2401	CREW ISO* IN	Ground to configure the unit for CREW ICS isolation. In this configuration, the copilot headset jack should be wired in parallel with the pilot headset output. The mics are wired as normal. In this mode, when the PILOT ISO button is selected, the pilot and copilot will hear each other, but will be intercom isolated from the passengers.
13	P2402	PILOT ISO MUSIC* IN	Ground to allow Music audio to be heard by the pilot during pilot isolate mode.
19	P2402	BUTTON PRESS TONE ENABLE* IN	Ground to enable beep tone annunciation of button presses
30	P2402	MUTE ON COM TX* IN	Ground to enable muting of other selected radios during mic selected COM transmission (mic-selected COM is still heard, but not other selected radios)

*Denotes Active Low (Ground to activate)

4.5 Audio Inputs/Outputs and Mic Keys

4.5.1 Mic Audio Inputs and Mic Keys

Table 4-7 Mic Audio Inputs and Mic Keys

Pin	Connector	Pin Name	Description	I/O
34	P2401	PILOT MIC KEY* IN	Enables respective MIC audio into the selected transceiver unit	IN
33	P2402	COPILOT MIC KEY* IN		IN
33	P2401	PILOT MIC AUDIO IN HI	Pilot Mic audio input and ground reference	IN
35	P2401	PILOT MIC IN LO		--
32	P2402	COPILOT MIC AUDIO IN HI	Copilot Mic audio input and ground reference	IN
34	P2402	COPILOT MIC IN LO		--
35	P2402	PASS 1 MIC AUDIO IN HI	Passenger 1 Mic audio and ground reference	IN
36	P2402	PASS 1 MIC AUDIO IN LO		--
37	P2402	PASS 2 MIC AUDIO IN HI	Passenger 2 Mic audio and ground reference	IN
38	P2402	PASS 2 MIC AUDIO IN LO		--

*Denotes Active Low (Ground to activate)

4.5.2 Intercom Key Inputs (if configured)

These inputs only perform the described ICS KEY function if the audio panel has been configured for KEYED ICS by configuration jumper settings (Section 2.3.1). For this configuration, intercom squelch levels should be set fully CCW (live MIC) because the MIC signal must also break the VOX threshold to be heard.

Table 4-8 Intercom Key Inputs

Pin	Connector	Pin Name	Description
17	P2402	PILOT ICS KEY* IN	Enables respective mic audio to be heard in the intercom
36	P2401	COPILOT ICS KEY* IN	
37	P2401	PASSENGER ICS KEY* IN	

*Denotes Active Low (Ground to activate)

4.5.3 COM Audio and Mic Keys

Table 4-9 COM Audion and Mic Keys

Pin	Connector	Pin Name	Description	I/O
12	P2401	COM 1 MIC KEY* OUT	Enables transmission on the respective transceiver unit	OUT
30	P2401	COM 2 MIC KEY* OUT		OUT
9	P2401	COM 1 AUDIO IN HI	COM 1 Audio Input	IN
11	P2401	COM 1 MIC AUDIO OUT HI	COM 1 Audio Output	OUT
10	P2401	COM 1 AUDIO LO	Ground Reference for COM 1	--
13	P2401	COM 2 AUDIO IN HI	COM 2 Audio Input	IN
15	P2401	COM 2 MIC AUDIO OUT HI	COM 2 Audio Output	OUT
14	P2401	COM 2 AUDIO LO	Ground Reference for COM 2	--

*Denotes Active Low (Sinks current to ground when active)

4.5.4 Alert Audio I/O

Table 4-10 Alert Audio I/O

Pin	Connector	Pin Name	Description	I/O
31	P2401	ALERT 1 AUDIO IN HI	Alert 1 Audio Input	IN
32	P2401	ALERT 1 AUDIO IN LO	Ground Reference for Alert 1	--
44	P2401	ALERT 2 AUDIO IN HI	Alert 2 Audio Input	IN
15	P2402	ALERT 3 AUDIO IN HI	Alert 3 Audio Input	IN
43	P2401	ALERT 2,3 AUDIO IN LO	Ground Reference for Alert 2 & 3	--

4.5.5 AUX and NAV Audio Inputs

Table 4-11 AUX and NAV Audio Inputs

Pin	Connector	Pin Name	Description	I/O
21	P2401	AUX1 AUDIO IN HI	AUX1 Audio Input	IN
22	P2401	AUX1 AUDIO IN LO	Ground Reference for AUX1 Input	--
7	P2401	AUX2 AUDIO IN HI	AUX2 Audio Input	IN
8	P2401	AUX2 AUDIO IN LO	Ground Reference for AUX2 Input	--
17	P2401	NAV 1 AUDIO IN HI	NAV 1 Audio Input	IN
18	P2401	NAV 1 AUDIO IN LO	NAV 1 Ground Reference	--
19	P2401	NAV 2 AUDIO IN HI	NAV 2 Audio Input	IN
20	P2401	NAV 2 AUDIO IN LO	NAV 2 Ground Reference	--

4.5.6 Failsafe Warning Audio

Table 4-12 Failsafe Warning Audio

Pin	Connector	Pin Name	Description	I/O
29	P2402	FAILSAFE WARN AUDIO IN HI	Failsafe Warning Audio Input	IN

4.5.7 Music Inputs

Table 4-13 Music Inputs

Pin	Connector	Pin Name	Description	I/O
23	P2402	MUSIC 1 IN LEFT	Music 1 Input	IN
24	P2402	MUSIC 1 IN RIGHT		IN
25	P2402	MUSIC 1 IN LO	Ground Reference for Music 1	--
26	P2402	MUSIC 2 IN LEFT	Music 2 Input	IN
27	P2402	MUSIC 2 IN RIGHT		IN
28	P2402	MUSIC 2 IN LO	Ground Reference for Music 2	--

4.5.8 Tel Audio I/O

Table 4-14 Tel Audio I/O

Pin	Connector	Pin Name	Description	I/O
3	P2401	TEL AUDIO IN HI	Telephone Audio Input	IN
4	P2401	TEL AUDIO LO	Ground Reference for Telephone	--
5	P2401	TEL MIC AUDIO OUT HI	TEL MIC Audio Output	OUT

4.5.9 Headset Outputs

Table 4-15 Headset Outputs

Pin	Connector	Pin Name	Description	I/O
16	P2402	PILOT HEADSET AUDIO OUT LEFT	Pilot Headset Audio Output	OUT
31	P2402	PILOT HEADSET AUDIO OUT RIGHT		OUT
1	P2402	PILOT HEADSET AUDIO OUT LO		--
3	P2402	COPILOT HEADSET AUDIO OUT LEFT	Copilot Headset Audio Output	OUT
4	P2402	COPILOT HEADSET AUDIO OUT RIGHT		OUT
2	P2402	COPILOT HEADSET AUDIO OUT LO		--
40	P2401	PASS HEADSET AUDIO OUT LEFT	Passenger Headset Audio Output	OUT
41	P2401	PASS HEADSET AUDIO OUT RIGHT		OUT
42	P2401	PASS HEADSET AUDIO OUT LO		--

NOTE

Copilot and Passenger headset outputs are internally the same connection. Separate Passenger headset output pins are provided for wiring convenience and GMA 340 pin compatibility.

NOTE

For CREW ISO configuration, the copilot's headphone jack should be wired in parallel with the pilot jack to the Pilot headset output pins. Passengers may be connected to either the copilot or passenger pins.

NOTE

Using a mono headset with an audio jack wired for stereo may damage the GMA 240. Installations using only mono headsets may use a stereo audio jack and leave the ring contact unconnected or install a switch as shown in Figure 4-4. Also note that many stereo headsets have a mono/stereo switch to be compatible with mono or stereo-wired jacks.

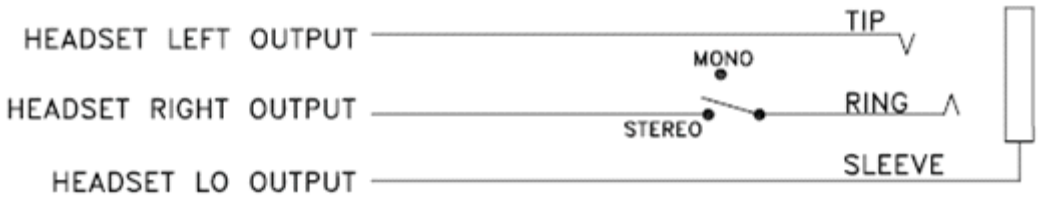


Figure 4-4 Audio Jack Wiring

4.5.10 COM Swap

Table 4-16 COM Swap

Pin	Connector	Pin Name	Description	I/O
20	P2402	COM SWAP* IN	Ground Through a Momentary PB Switch to Swap Active COM (COM 1 or COM 2)	IN
21	P2402	COM SWAP RETURN	Return Path for PB Switch	--

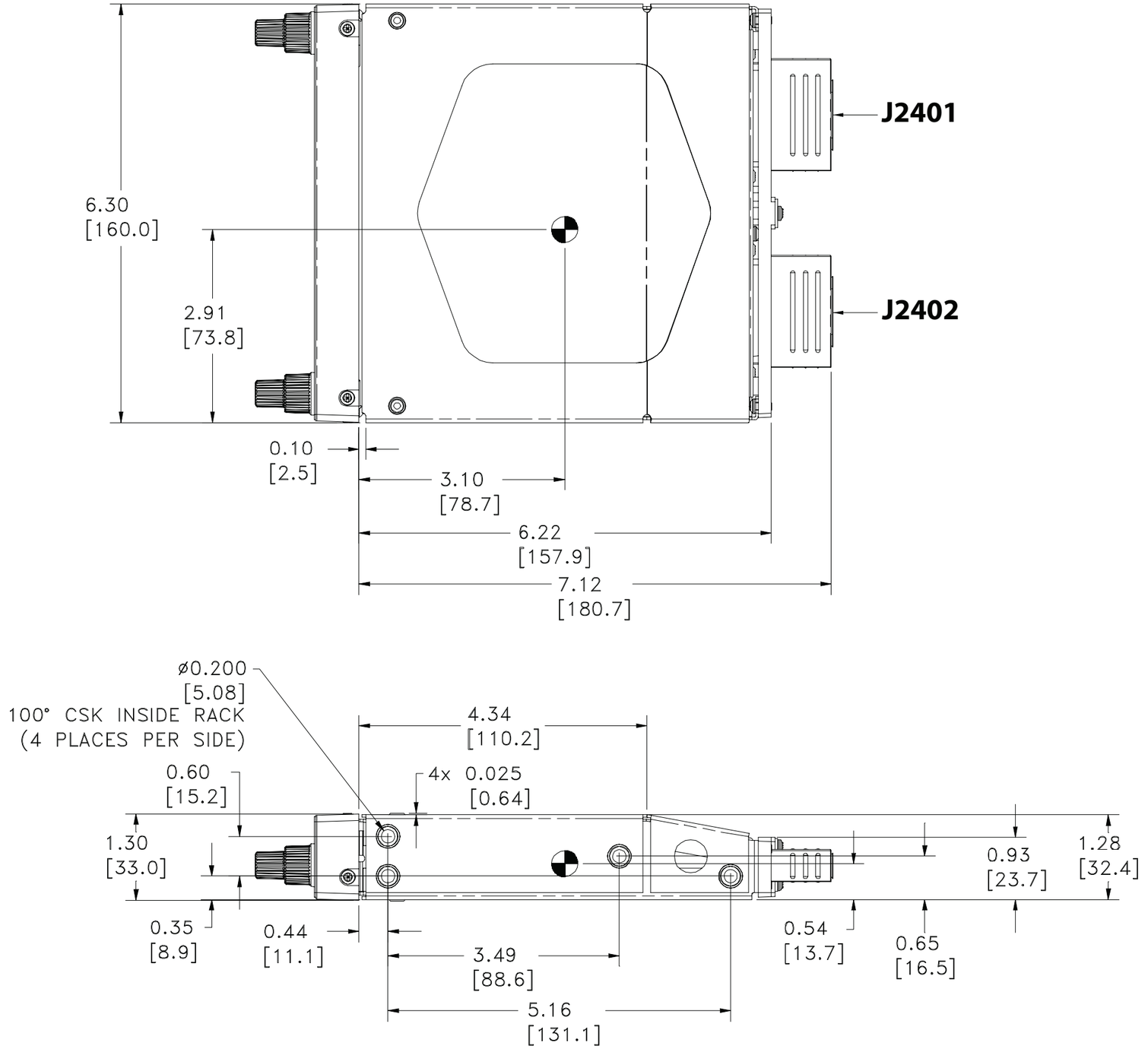


Figure A-1 GMA 240 Outline Drawing

011-00403-00 CONNECTOR/RACK KIT				
	ITEM	PART NUMBER	DESCRIPTION	QTY
	1	115-00262-00	INSTALL RACK	1
	2	125-00040-00	CONNECTOR PLATE	1
	3	211-60234-08	SCREW, #4-40x.250, PHP, SS/P	6
	4	211-63234-12	SCREW, #4-40x.500, FLHP, SS/P	4
	5	330-00185-44	CONN, HI-DENS D-SUB, MIL-CRP	2
	6	330-00220-25	BACKSHELL, D-SUB, METAL	2
	7	125-00046-00	NUTPLATE, D-SUB, 25 POS	2
	8	210-00036-07	NUT, HEX, #6-32, SS	1
	9	115-00261-00	CAPTIVE NUT COVER	1
NOT SHOWN		336-00021-00	CONT, PIN, MIL CRIMP, SIZE 22D	100

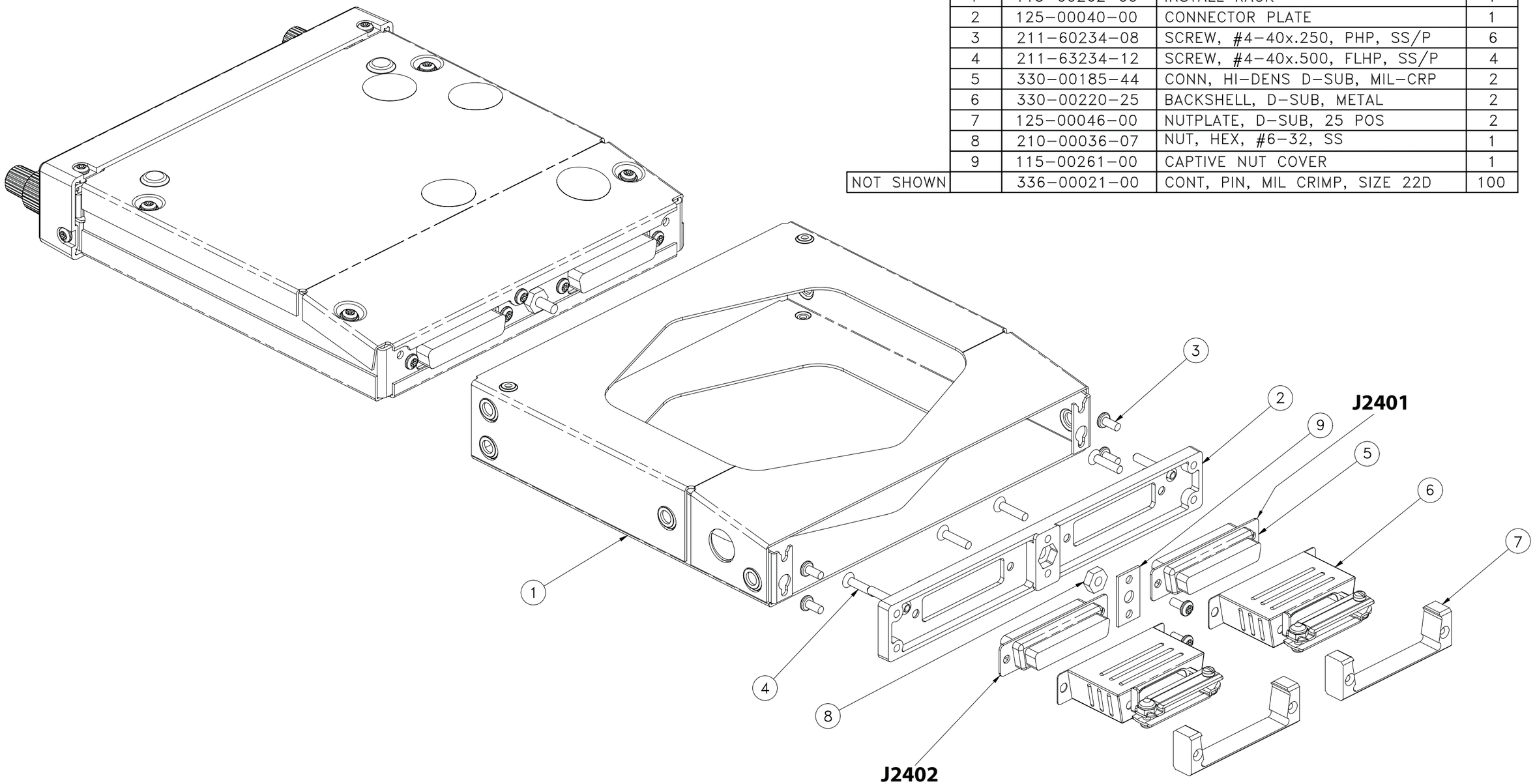
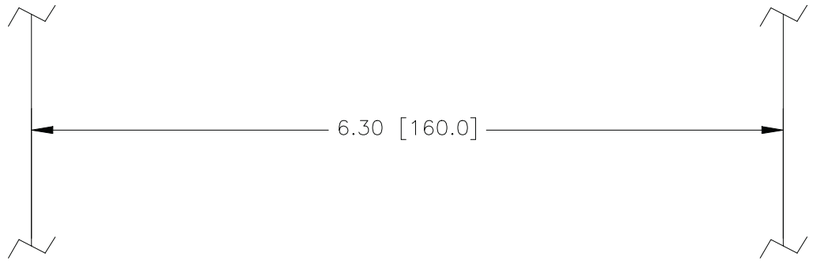


Figure A-2 GMA 240 Connector/Rack Assembly Drawing

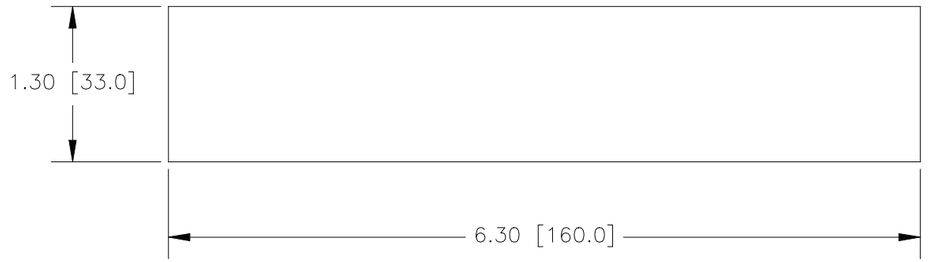
OPTION 1:

STACK CUTOUT (RACK INSTALLED FROM FRONT OF AIRCRAFT PANEL)



OPTION 2:

RADIO CUTOUT (RACK INSTALLED FROM FRONT OF AIRCRAFT PANEL)



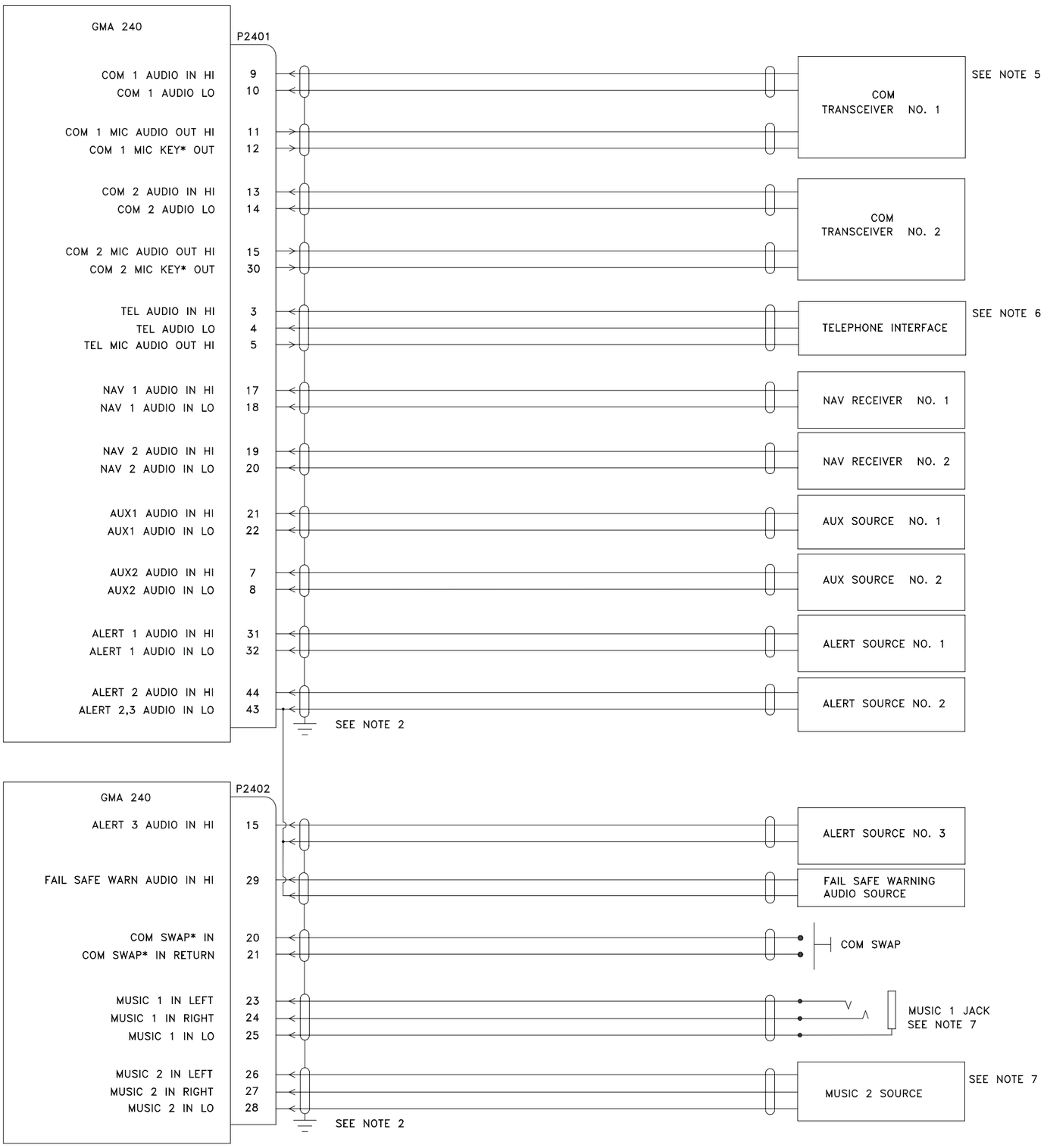
OPTION 3:

RADIO CUTOUT (RACK INSTALLED FROM BACK OF AIRCRAFT PANEL ONLY) MAXIMUM AIRCRAFT PANEL THICKNESS IS .125 INCH [3.2 mm]

NOTES:

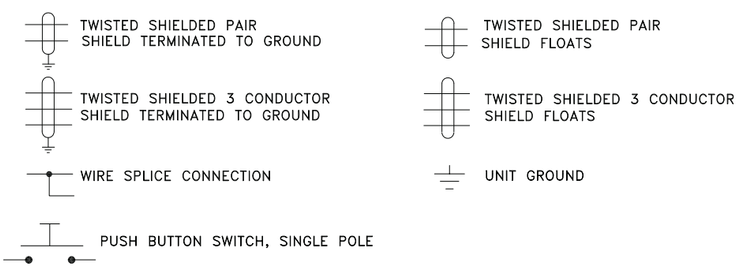
1. DIMENSIONS: INCH [mm].
2. IF THE FRONT LIP OF THE MOUNTING RACK IS BEHIND THE SURFACE OF THE AIRCRAFT PANEL, THE UNIT CONNECTORS MAY NOT FULLY ENGAGE.

Figure A-3 GMA 240 Recommended Panel Cutout Dimensions


GMA 240
P2401
COM 1 AUDIO IN HI 9
COM 1 AUDIO LO 10
COM 1 MIC AUDIO OUT HI 11
COM 1 MIC KEY* OUT 12
COM 2 AUDIO IN HI 13
COM 2 AUDIO LO 14
COM 2 MIC AUDIO OUT HI 15
COM 2 MIC KEY* OUT 30
TEL AUDIO IN HI 3
TEL AUDIO LO 4
TEL MIC AUDIO OUT HI 5
NAV 1 AUDIO IN HI 17
NAV 1 AUDIO IN LO 18
NAV 2 AUDIO IN HI 19
NAV 2 AUDIO IN LO 20
AUX1 AUDIO IN HI 21
AUX1 AUDIO IN LO 22
AUX2 AUDIO IN HI 7
AUX2 AUDIO IN LO 8
ALERT 1 AUDIO IN HI 31
ALERT 1 AUDIO IN LO 32
ALERT 2 AUDIO IN HI 44
ALERT 2,3 AUDIO IN LO 43
SEE NOTE 2
COM TRANSCEIVER NO. 1
SEE NOTE 5
COM TRANSCEIVER NO. 2
TELEPHONE INTERFACE
SEE NOTE 6
NAV RECEIVER NO. 1
NAV RECEIVER NO. 2
AUX SOURCE NO. 1
AUX SOURCE NO. 2
ALERT SOURCE NO. 1
ALERT SOURCE NO. 2
GMA 240
P2402
ALERT 3 AUDIO IN HI 15
FAIL SAFE WARN AUDIO IN HI 29
COM SWAP* IN 20
COM SWAP* IN RETURN 21
MUSIC 1 IN LEFT 23
MUSIC 1 IN RIGHT 24
MUSIC 1 IN LO 25
MUSIC 2 IN LEFT 26
MUSIC 2 IN RIGHT 27
MUSIC 2 IN LO 28
SEE NOTE 2
ALERT SOURCE NO. 3
FAIL SAFE WARNING AUDIO SOURCE
COM SWAP
MUSIC 1 JACK SEE NOTE 7
MUSIC 2 SOURCE
SEE NOTE 7

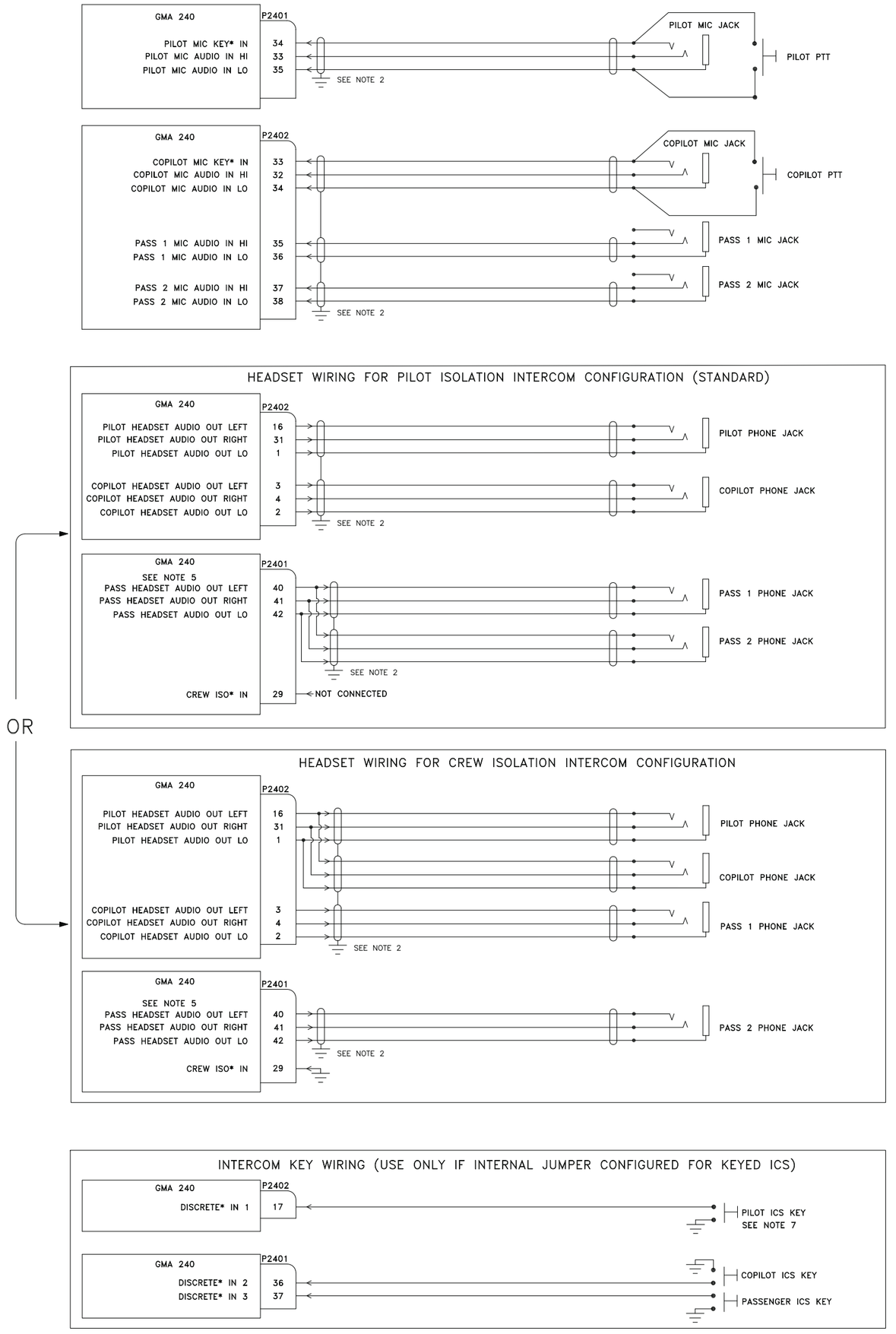
NOTES:

1. ALL WIRE SHOULD BE 24 AWG OR LARGER TEFLON INSULATED.
2. UNLESS OTHERWISE INDICATED, ALL SHIELDS MUST BE TERMINATED AT THE GMA 240 END ONLY. DAISY CHAIN SHIELDS TO A SUITABLE RING TERMINAL AND ATTACH TO CENTER GROUNDING LUGS IN BACK OF CONNECTOR BACKPLATE.
3. ALL AUDIO JACKS USED IN THE INSTALLATION MUST BE ELECTRICALLY ISOLATED FROM CHASSIS TO AVOID GROUND LOOPS. THIS MAY REQUIRE THE USE OF INSULATION WASHERS WHEN MOUNTING JACKS. USE OF ISOLATED TYPE JACKS IS HIGHLY RECOMMENDED TO SIMPLIFY INSTALLATION.
4. SYMBOL DESIGNATIONS


TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
TWISTED SHIELDED PAIR SHIELD FLOATS
TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
WIRE SPLICE CONNECTION
UNIT GROUND
PUSH BUTTON SWITCH, SINGLE POLE

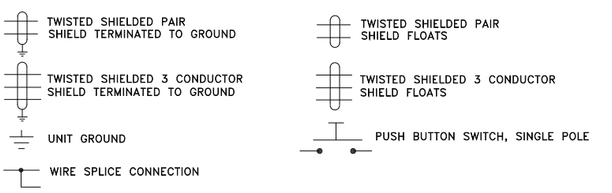
5. TRANSCEIVER INTERFACES CAN ALSO BE WIRED THROUGH SUITABLE JACKS AND CABLES TO HANDHELD COMS THAT HAVE HEADSET INTERFACE CAPABILITY. THE HANDHELD'S HEADSET OUTPUT (LEFT CHANNEL ONLY IF STEREO) CONNECTS TO THE GMA'S COM AUDIO IN HI AND COM AUDIO LO PINS, THE HANDHELD'S MIC INPUT CONNECTS TO GMA'S COM MIC AUDIO OUT HI AND COM AUDIO LO PINS, AND THE HANDHELD'S PTT KEY CONNECTS TO GMA'S COM MIC KEY* OUT. SEE THE TRANSCEIVER'S INSTRUCTION MANUAL.
6. THE TELEPHONE INTERFACE MAY BE WIRED TO A FIXED MOUNTED TELEPHONE SOURCE (SHOWN) OR TO A SUITABLE JACK FOR A PORTABLE TELEPHONE.
7. BOTH MUSIC INPUTS MAY BE WIRED TO EITHER AN EXTERNAL JACK (AS SHOWN FOR MUSIC 1) OR A FIXED MOUNTED MUSIC SOURCE (AS SHOWN FOR MUSIC 2).

Figure B-1 GMA 240 Interconnect Drawing (page 1 of 3)

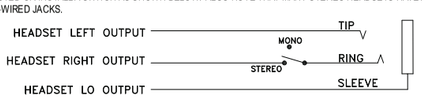

GMA 240
P2401
PILOT MIC KEY* IN 34
PILOT MIC AUDIO IN HI 33
PILOT MIC AUDIO IN LO 35
SEE NOTE 2
PILOT MIC JACK
PILOT PTT
GMA 240
P2402
COPILOT MIC KEY* IN 33
COPILOT MIC AUDIO IN HI 32
COPILOT MIC AUDIO IN LO 34
PASS 1 MIC AUDIO IN HI 35
PASS 1 MIC AUDIO IN LO 36
PASS 2 MIC AUDIO IN HI 37
PASS 2 MIC AUDIO IN LO 38
SEE NOTE 2
COPILOT MIC JACK
COPILOT PTT
PASS 1 MIC JACK
PASS 2 MIC JACK
HEADSET WIRING FOR PILOT ISOLATION INTERCOM CONFIGURATION (STANDARD)
GMA 240
P2402
PILOT HEADSET AUDIO OUT LEFT 16
PILOT HEADSET AUDIO OUT RIGHT 31
PILOT HEADSET AUDIO OUT LO 1
COPILOT HEADSET AUDIO OUT LEFT 3
COPILOT HEADSET AUDIO OUT RIGHT 4
COPILOT HEADSET AUDIO OUT LO 2
SEE NOTE 2
PILOT PHONE JACK
COPILOT PHONE JACK
GMA 240
SEE NOTE 5
P2401
PASS HEADSET AUDIO OUT LEFT 40
PASS HEADSET AUDIO OUT RIGHT 41
PASS HEADSET AUDIO OUT LO 42
CREW ISO* IN 29
SEE NOTE 2
NOT CONNECTED
PASS 1 PHONE JACK
PASS 2 PHONE JACK
OR
HEADSET WIRING FOR CREW ISOLATION INTERCOM CONFIGURATION
GMA 240
P2402
PILOT HEADSET AUDIO OUT LEFT 16
PILOT HEADSET AUDIO OUT RIGHT 31
PILOT HEADSET AUDIO OUT LO 1
COPILOT HEADSET AUDIO OUT LEFT 3
COPILOT HEADSET AUDIO OUT RIGHT 4
COPILOT HEADSET AUDIO OUT LO 2
SEE NOTE 2
PILOT PHONE JACK
COPILOT PHONE JACK
PASS 1 PHONE JACK
GMA 240
SEE NOTE 5
P2401
PASS HEADSET AUDIO OUT LEFT 40
PASS HEADSET AUDIO OUT RIGHT 41
PASS HEADSET AUDIO OUT LO 42
CREW ISO* IN 29
SEE NOTE 2
PASS 2 PHONE JACK
INTERCOM KEY WIRING (USE ONLY IF INTERNAL JUMPER CONFIGURED FOR KEYED ICS)
GMA 240
P2402
DISCRETE* IN 1 17
PILOT ICS KEY
SEE NOTE 7
GMA 240
P2401
DISCRETE* IN 2 36
DISCRETE* IN 3 37
COPILOT ICS KEY
PASSENGER ICS KEY

NOTES:

1. ALL WIRE SHOULD BE 24 AWG OR LARGER TEFLON INSULATED.
2. UNLESS OTHERWISE INDICATED, ALL SHIELDS MUST BE TERMINATED AT THE GMA 240 END ONLY. DAISY CHAIN SHIELDS TO A SUITABLE RING TERMINAL AND ATTACH TO CENTER GROUNDING LUGS IN BACK OF CONNECTOR BACKPLATE.
3. ALL AUDIO JACKS USED IN THE INSTALLATION MUST BE ELECTRICALLY ISOLATED FROM CHASSIS TO AVOID GROUND LOOPS. THIS MAY REQUIRE THE USE OF INSULATION WASHERS WHEN MOUNTING JACKS. USE OF ISOLATED TYPE JACKS IS HIGHLY RECOMMENDED TO SIMPLIFY INSTALLATION.
4. SYMBOL DESIGNATIONS



5. COPILOT AND PASSENGER HEADSET OUTPUT PINS ARE ELECTRICALLY THE SAME CONNECTION INSIDE THE GMA 240. SEPARATE PINS ARE SUPPLIED FOR WIRING CONVENIENCE AND GMA 340 COMPATIBILITY.
6. PLUGGING A MONAURAL HEADSET INTO A STEREO JACK SHORTS THE RIGHT CHANNEL OUTPUT TO GROUND. THIS CAUSES EXCESS CURRENT TO BE DRAWN AND MAY DAMAGE THE GMA 240. STEREO HEADSETS ARE RECOMMENDED IF STEREO JACKS ARE INSTALLED. INSTALLATIONS USING ONLY MONO HEADSETS MAY USE A STEREO AUDIO JACK AND LEAVE THE RING CONTACT UNCONNECTED OR INSTALL A SWITCH AS SHOWN BELOW. ALSO NOTE THAT MANY STEREO HEADSETS HAVE A MONO/STEREO SWITCH TO BE COMPATIBLE WITH MONO OR STEREO-WIRED JACKS.



7. ICS KEY INPUTS ARE ALSO COMPATIBLE WITH TWO-STAGE PTT KEYS IN WHICH THE FIRST DETENT ACTIVATES THE ICS KEY AND THE SECOND DETENT ACTIVATES THE TRANSCEIVER PTT (CREW ONLY) FOR THAT POSITION.

Figure B-1 GMA 240 Interconnect Drawing (page 2 of 3)

APPENDIX B Interconnect Drawings

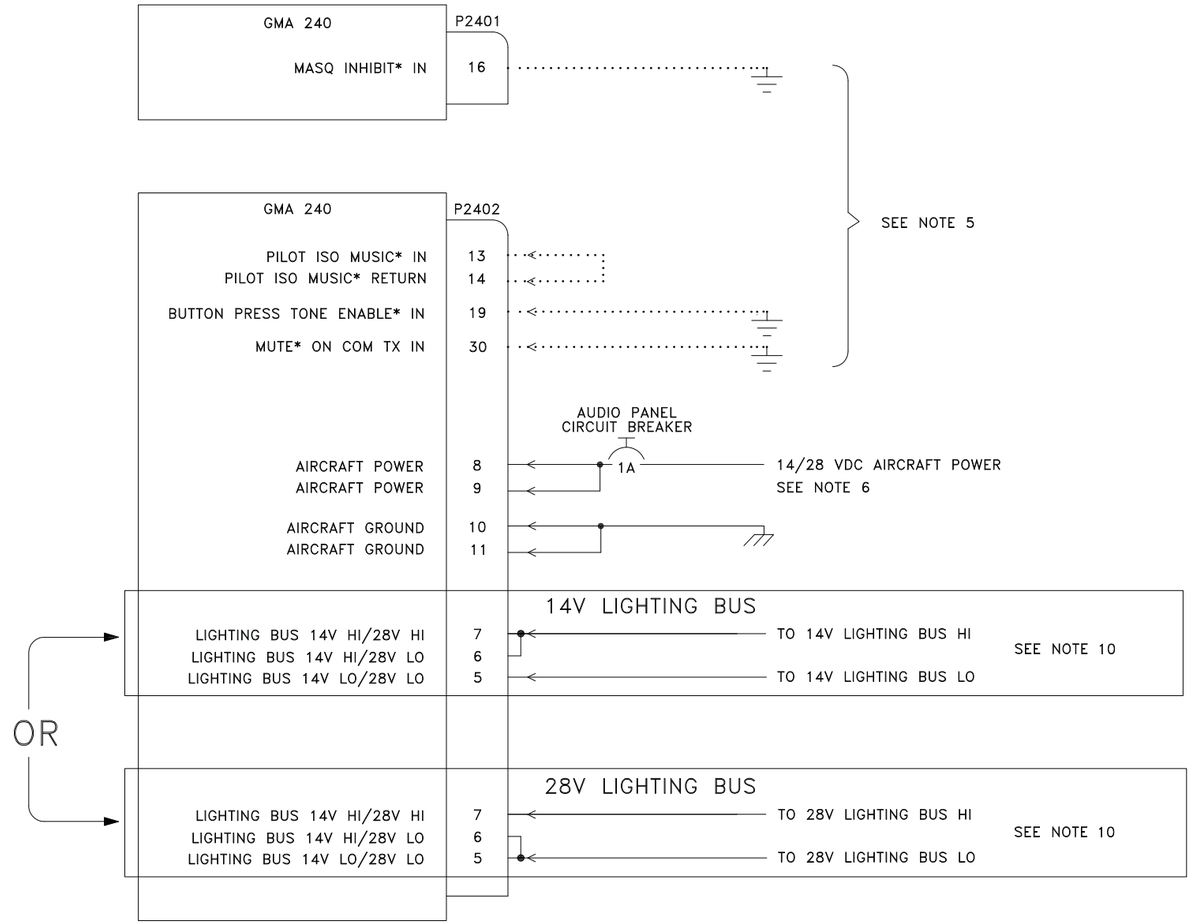
NOTES:

1. ALL WIRE SHOULD BE 24 AWG OR LARGER TEFLON INSULATED.
2. UNLESS OTHERWISE INDICATED, ALL SHIELDS MUST BE TERMINATED AT THE GMA 240 END ONLY. DAISY CHAIN SHIELDS TO A SUITABLE RING TERMINAL AND ATTACH TO CENTER GROUNDING LUGS IN BACK OF CONNECTOR BACKPLATE.
3. ALL AUDIO JACKS USED IN THE INSTALLATION MUST BE ELECTRICALLY ISOLATED FROM CHASSIS TO AVOID GROUND LOOPS. THIS MAY REQUIRE THE USE OF INSULATION WASHERS WHEN MOUNTING JACKS. USE OF ISOLATED TYPE JACKS IS HIGHLY RECOMMENDED TO SIMPLIFY INSTALLATION.
4. SYMBOL DESIGNATIONS

   WIRE SPLICE CONNECTION — CIRCUIT BREAKER

   AIRFRAME GROUND — UNIT GROUND

   ····· CONFIGURATION WIRING CONNECTION
5. CONFIGURATION PINS ARE GROUNDED TO INITIATE THE LABELED FUNCTION. OPTIONALLY, THEY MAY BE CONNECTED THROUGH A SWITCH TO GROUND IF TOGGLING IS DESIRED. SEE INSTALLATION MANUAL TEXT FOR DETAILS.
6. IF A DEDICATED CIRCUIT BREAKER IS DESIRED, 1 A RATING IS RECOMMENDED. AIRCRAFT GROUND SHOULD BE CONNECTED DIRECTLY TO THE AIRFRAME USING MINIMAL WIRE LENGTH.
7. THE PROVIDED FRONT PANEL JACK AUDIO CABLES ARE COMPATIBLE WITH MANY PHONES AND PORTABLE AUDIO PLAYERS. SOME DEVICES HAVE OTHER CONNECTOR STYLES.
8. IF THE PHONE HAS A 2.5 MM JACK, THE PROVIDED 2.5 MM CABLE IS THE MOST COMMON CONFIGURATION. SOME PHONES WITH 2.5 MM JACKS USE CROSSOVER CABLES THAT SWAP THE MIC AND EARPIECE CONNECTION. IF THIS CONVERSION IS NECESSARY, OR IF A DIFFERENT STYLE CONNECTOR IS NEEDED TO INTERFACE TO THE PHONE, USE THE ABOVE CONNECTION DIAGRAM AS A GUIDE FOR HOW THE PROVIDED CABLE SHOULD BE MODIFIED. ALSO CONSIDER CHECKING WITH THE PHONE MANUFACTURER OR ACCESSORY PROVIDER TO SEE IF A SUITABLE ADAPTOR CABLE IS COMMERCIALLY AVAILABLE.
9. FOR AUDIO PLAYERS, THE PROVIDED CABLES ARE STANDARD FOR DEVICES THAT USE STEREO AUDIO JACKS. SOME DEVICES USE SPECIAL CONNECTOR STYLES. IF A DIFFERENT STYLE CONNECTOR IS NEEDED TO INTERFACE TO THE AUDIO PLAYER, USE THE ABOVE CONNECTION DIAGRAM AS A GUIDE FOR HOW THE PROVIDED CABLE SHOULD BE MODIFIED. ALSO CONSIDER CHECKING WITH THE DEVICE MANUFACTURER OR ACCESSORY PROVIDER TO SEE IF A SUITABLE ADAPTOR CABLE IS COMMERCIALLY AVAILABLE.
10. IF PINS 5, 6, & 7 ARE NOT CONNECTED IN THE 14V OR 28V CONFIGURATION, BACKLIGHTING WILL NOT FUNCTION (NO BACKLIGHTING).



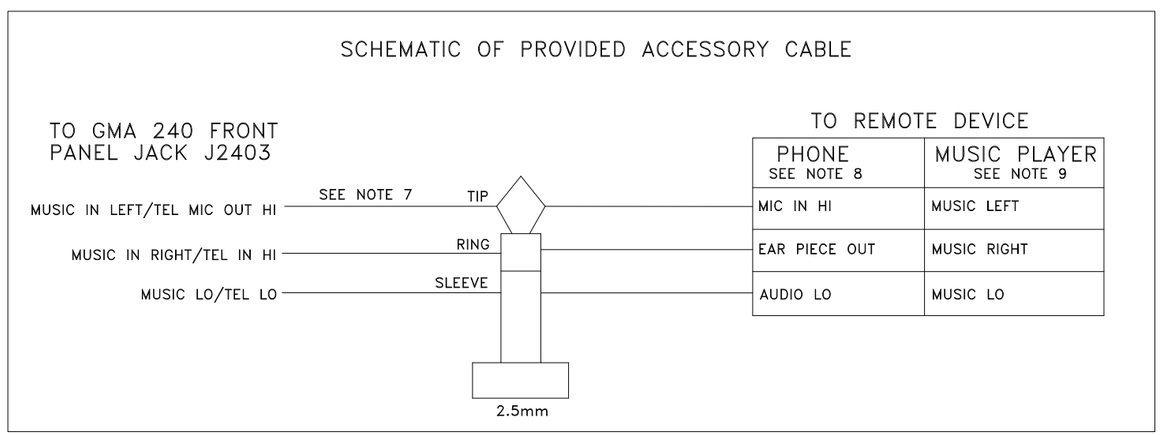


Figure B-1 GMA 240 Interconnect Drawing (page 3 of 3)

GMA240 J2401

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
COM 2 MIC AUDIO OUT HI	COM 2 AUDIO LO	COM 2 AUDIO IN HI	COM 1 MIC KEY* OUT	COM 1 MIC AUDIO OUT HI	COM 1 AUDIO LO	COM 1 AUDIO IN HI	AUX2 AUDIO IN LO	AUX2 AUDIO IN HI	RESERVED	TEL MIC AUDIO OUT HI	TEL AUDIO LO	TEL AUDIO IN HI	RESERVED	RESERVED

30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
COM 2 MIC KEY* OUT	CREW ISO* IN	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	AUX1 AUDIO IN LO	AUX1 AUDIO IN HI	NAV 2 AUDIO IN LO	NAV 2 AUDIO IN HI	NAV 1 AUDIO IN LO	NAV 1 AUDIO IN HI	MASQ INHIBIT* IN

44	43	42	41	40	39	38	37	36	35	34	33	32	31
ALERT 2 AUDIO IN HI	ALERT 2,3 AUDIO IN LO	PASS HEADSET AUDIO OUT LO	PASS HEADSET AUDIO OUT RIGHT	PASS HEADSET AUDIO OUT LEFT	RESERVED	RESERVED	RESERVED	RESERVED	PILOT MIC AUDIO IN LO	PILOT MIC KEY* IN	PILOT MIC AUDIO IN HI	ALERT 1 AUDIO IN LO	ALERT 1 AUDIO IN HI

GMA240 J2402

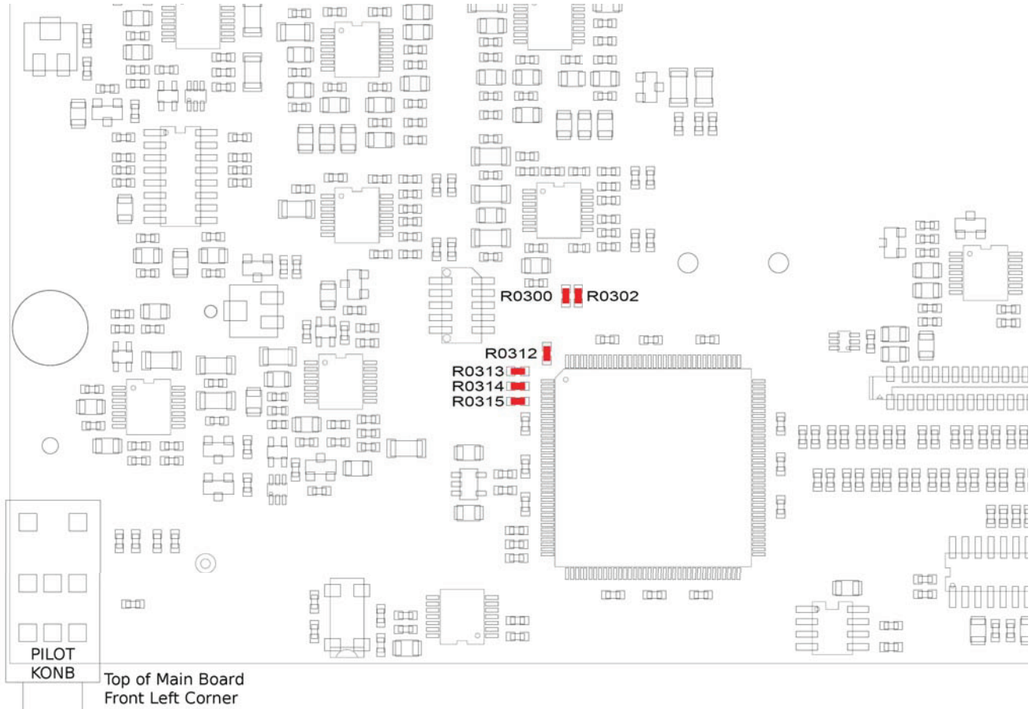
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
ALERT 3 AUDIO IN HI	PILOT ISO MUSIC* RETURN	PILOT ISO MUSIC* IN	RESERVED	AIRCRAFT GROUND	AIRCRAFT GROUND	AIRCRAFT POWER	AIRCRAFT POWER	LIGHTING BUS 14V HI/28V HI	LIGHTING BUS 14V HI/28V LO	LIGHTING BUS 14V LO/28V LO	COPILOT HEADSET AUDIO OUT RIGHT	COPILOT HEADSET AUDIO OUT LEFT	COPILOT HEADSET AUDIO OUT LO	PILOT HEADSET AUDIO OUT LO

30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
MUTE* ON COM TX IN	FAILSAFE WARN AUDIO IN HI	MUSIC 2 IN LO	MUSIC 2 IN RIGHT	MUSIC 2 IN LEFT	MUSIC 1 IN LO	MUSIC 1 IN RIGHT	MUSIC 1 IN LEFT	RESERVED	COM SWAP* IN RETURN	COM SWAP* IN	BUTTON PRESS TONE ENABLE* IN	RESERVED	RESERVED	PILOT HEADSET AUDIO OUT LEFT

44	43	42	41	40	39	38	37	36	35	34	33	32	31
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	PASS 2 MIC AUDIO IN LO	PASS 2 MIC AUDIO IN HI	PASS 1 MIC AUDIO IN LO	PASS 1 MIC AUDIO IN HI	COPILOT MIC AUDIO IN LO	COPILOT MIC KEY* IN	COPILOT MIC AUDIO IN HI	PILOT HEADSET AUDIO OUT RIGHT

Figure B-2 GMA 240, J2401 & J2402 Connector Layout Drawing

Top of Main Board



Bottom of Main Board

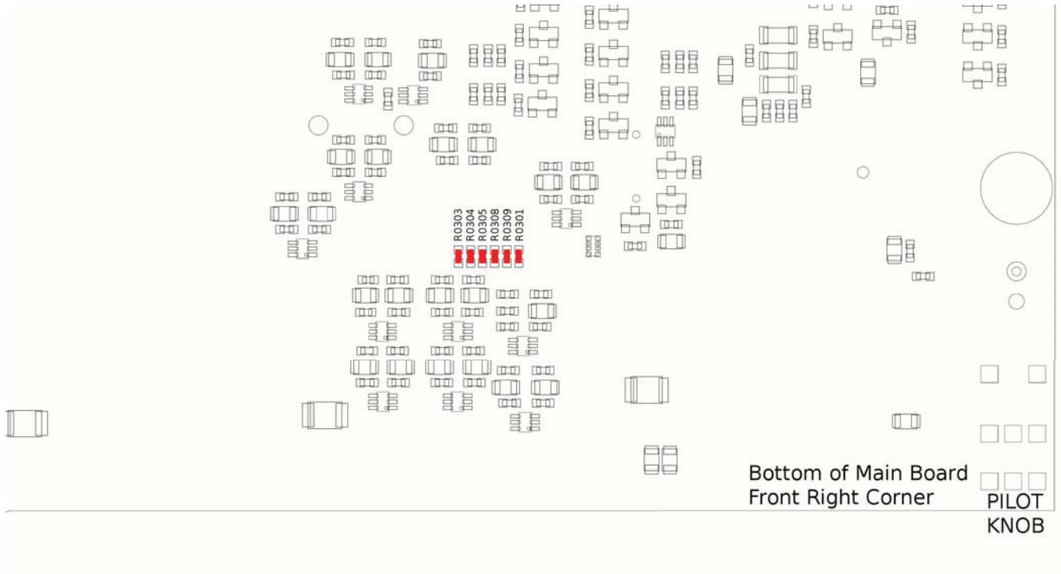


Figure C-1 GMA 240 Internal ConfigurationJumper Layout Drawing